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| 10/579,319  | 05/16/2006  | Karci Krizanovic     | 1382.021USU         | 6554             |
| 27623 7590 04/28/2008<br>OHLANDT, GREELEY, RUGGIERO & PERLE, LLP<br>ONE LANDMARK SQUARE, 10TH FLOOR<br>STAMFORD, CT 06901 |             |                      |                     |                  |
| EXAMINER<br>YOUNG, SHAWQUITA  |             |                      |                     |                  |
| ART UNIT  |             | PAPER NUMBER         |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/579,319

**Applicant(s)**

KRIZANOVIC ET AL.

**Examiner**

SHAWQUIA YOUNG

**Art Unit**

1626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/02)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

Claims 1-9 are currently pending in the instant application.

#### **I. *Response to Arguments***

Applicant's arguments, filed February 4, 2008, with respect to the rejection of claims 1-9 under 35 USC 103 as being unpatentable over Alicot, et al. (US 4,371,698) and the rejection of claims 1-9 under 35 USC 112, second paragraph as being indefinite have been fully considered but are only partially persuasive. Applicants amendment has overcome the rejection of claims 1-9 under 35 USC 112, second paragraph as being indefinite and this rejection is withdrawn. However, Applicants arguments with respect to the rejection of claims 1-9 under 35 USC 103 as being unpatentable over Alicot, et al. are not persuasive and the rejection is maintained.

Applicants traverse the rejection of claims 1-9 under 35 USC 103 as being unpatentable over Alicot, et al. (US 4,371,698). Applicants interpret the Alicot, et al. reference as dealing with purification of 2-mercaptobenzothiazole (2-MBT) in aniline, consists primarily in returning the aniline filtrates from the product purification into the system. To prevent accumulation of impurities, which originate in the synthesis reactor, during continued recycles of used filtrates, it is necessary to remove a part of the used filtrates from the system. The amount of removed filtrates should correspond with the content of impurities in the raw product, i.e. if the raw product contains 5-10% of impurities, the corresponding amount of the filtrate should be removed from the system to keep mutual equilibrium in the composition of the system streams. Applicants further

argue that the difference between the Alicot, et al. reference and the instant application consists in the necessity to thicken (concentrate) by distillation enormous amounts of aniline filtrates from crystallization and from washing. Applicants emphasize that with the solution according to the instant application, it is not necessary to concentrate the aniline filtrates, the necessity of distillation falls away, which fact may be considered to be the most substantial contribution. Applicants state that "in contrast to the method disclosed in the prior art, according to the instant application: 1) the parts of liquid phases, which are returned into the process, are not thickened (concentrated) at all and 2) the not thickened liquid phase is at the same time (simultaneously) returned to two places of the process: into the synthesis reactor and to the stage of subsequent crystallization.

The Examiner wants to point out that Applicants' claims are not fully supported by the original specification. The method disclosed in Applicants' claims is different from the method disclosed in the original specification. The Examiner will interpret both methods. According to the instant claims, 2-MBT is obtained from a melt of raw product that is prepared in a synthesis reactor by the reaction of aniline, carbon disulphide and sulphur, wherein the melt contains 2-MBT, unreacted starting materials, intermediate products and pitches. The 2-MBT raw product is crystallized from an aniline solution. The crystallized MBT is apparently separated from the aniline solution because applicants discuss the presence of a liquid phase. The liquid phase from the crystallization is divided into to three parts ( $F_{k1}$ ), ( $F_{k2}$ ) and ( $F_{k3}$ ). One part of the liquid phase ( $F_{k1}$ ) is removed out of the process. The second part ( $F_{k2}$ ) of the liquid phase is

Art Unit: 1626

returned to the synthesis reactor for the preparation of the raw product and sulphur and carbon disulphide is added to the reactor. Step (e) is completely unclear. The Examiner interprets that the crystallized 2-MBT obtained from step (a) is added to the second part of the liquid phase ( $F_{k2}$ ), is purified a second time and the "pure 2-MBT" is separated from second part of the liquid phase ( $F_{k2}$ ). Then the third part of the liquid phase ( $F_{k3}$ ) from the crystallization in step (a) is combined with the liquid phase from step (e) and optionally aniline is added for crystallization of a further batch of 2-MBT raw product. Then steps a) to f) are repeated. This is the method described by the instant claims.

However, Applicants' specification discloses a different method. According to the original specification, the 2-MBT raw product from the synthesis reactor is dissolved in an excess of pure aniline. The solution is cooled down and crystals of 2-MBT are precipitated and separated from liquid phase ( $F_K$ ). The crystallized 2-MBT is washed with fresh aniline and the pure product is separate from the liquid phase ( $F_R$ ). Then 1/3 of the liquid phase ( $F_K$ ) is placed into the synthesis reactor and reacted with sulphur and carbon disulphide. The raw product of 2-MBT is dissolved in the remained (2/3) of the liquid phase ( $F_K$ ) and is then combined with the liquid phase ( $F_R$ ). At this point all of the liquid phases are combined in one container. After cooling, the crystals of the second batch of 2-MBT are precipitated and separated from the liquid phase. The crystals of the second batch of 2-MBT are washed with pure aniline and filtered. Then 1/3 of the liquid phase is placed into the synthesis reactor and the above method is repeated. (See pages 5-7 and working example 2)

As mentioned above, Applicants state that "in contrast to the method disclosed in the prior art, according to the instant application: 1) the parts of liquid phases, which are returned into the process, are not thickened (concentrated) at all and 2) the not thickened liquid phase is at the same time (simultaneously) returned to two places of the process: into the synthesis reactor and to the stage of subsequent crystallization. The examiner wants to point out that the reference does teach that the liquid phases are distilled to recover the unreacted starting material and the valuable by-products: aniline and benzothiazole (See column 4, lines 9-15). It is well known in the art that distillation is a method of purification just like crystallization (See URL:<http://www.infoplease.com/ce6/sci/A0857776.html>). So the Examiner wants to emphasize that distillation is used to purify the crystallized 2-MBT and easily recover the unreacted starting material. The reference teaches recycling of the unreacted starting material and reintroducing it wholly or in part in the synthesis reactor. In the example of Alicot, et al., it states that the "amount removed from the filtrate is distilled under vacuum so as to recover the aniline and the benzothiazole. The undistillable part is either eliminated or recycled wholly or in part in the synthesis reactor". According to step (e) in the instant claims, "final purification of the crystallized 2-MBT...." is used. Applicants do not specify what type of purification method is used and therefore reads on various purification methods such as washing and filtration, distillation, etc. Further, purification methods can be interchangeable.

Applicants also state that the second difference between the instant claims and the prior art reference is that "the not thickened (concentrated) liquid phase is

Art Unit: 1626

simultaneously returned to two places of the process: into the synthesis reactor and the stage of subsequent crystallization". As stated above, using a concentrated amount does not alter the reaction. Applicants are introducing limitations that are not present in the instant claims. Applicants use the language "includes the following steps" in relation to the method claims, this language is considered open-ended and could include more steps than what is disclosed in claim 1. Therefore, Applicants' method claims are not limited to the seven steps disclosed in claim 1.

The Examiner maintains the position that batch and continuous processes are not patentably distinct absent unexpected results (See *In re Dilnot*) for the reasons stated in the previous Office Action. Applicants' arguments have not shown that the instant claims are not obvious over the prior art reference of Alicot, et al. Therefore, the rejection of claims 1-9 under 35 USC 103 is maintained.

## **II. *Rejection(s)***

### ***Claim Rejections - 35 USC § 112, 1<sup>st</sup> paragraph***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Specifically, method of claims 1-9 is not described in the original specification in the manner that they are written in the claims. The method disclosed in Applicants' claims is different from the method disclosed in the original specification. The Examiner will interpret both methods. According to the

Art Unit: 1626

instant claims, 2-MBT is obtained from a melt of raw product that is prepared in a synthesis reactor by the reaction of aniline, carbon disulphide and sulphur, wherein the melt contains 2-MBT, unreacted starting materials, intermediate products and pitches. The 2-MBT raw product is crystallized from an aniline solution. The crystallized MBT is apparently separated from the aniline solution because applicants discuss the presence of a liquid phase. The liquid phase from the crystallization is divided into to three parts ( $F_{k1}$ ), ( $F_{k2}$ ) and ( $F_{k3}$ ). One part of the liquid phase ( $F_{k1}$ ) is removed out of the process. The second part ( $F_{k2}$ ) of the liquid phase is returned to the synthesis reactor for the preparation of the raw product and sulphur and carbon disulphide is added to the reactor. Step (e) is completely unclear. The Examiner interprets that the crystallized 2-MBT obtained from step (a) is added to the second part of the liquid phase ( $F_{k2}$ ), is purified a second time and the "pure 2-MBT" is separated from second part of the liquid phase ( $F_{k2}$ ). Then the third part of the liquid phase ( $F_{k3}$ ) from the crystallization in step (a) is combined with the liquid phase from step (e) and optionally aniline is added for crystallization of a further batch of 2-MBT raw product. Then steps a) to f) are repeated. This is the method described by the instant claims.

However, Applicants' specification discloses a different method. According to the original specification, the 2-MBT raw product from the synthesis reactor is dissolved in an excess of pure aniline. The solution is cooled down and crystals of 2-MBT are precipitated and separated from liquid phase ( $F_K$ ). The crystallized 2-MBT is washed with fresh aniline and the pure product is separate from the liquid phase ( $F_R$ ). Then 1/3 of the liquid phase ( $F_K$ ) is placed into the synthesis reactor and reacted with sulphur and



Art Unit: 1626

carbon disulphide. The raw product of 2-MBT is dissolved in the remained (2/3) of the liquid phase ( $F_K$ ) and is then combined with the liquid phase ( $F_R$ ). At this point all of the liquid phases are combined in one container. After cooling, the crystals of the second batch of 2-MBT are precipitated and separated from the liquid phase. The crystals of the second batch of 2-MBT are washed with pure aniline and filtered. Then 1/3 of the liquid phase is placed into the synthesis reactor and the above method is repeated. (See pages 5-7 and working example 2)

According to the original specification, the initial liquid phase obtained is not separated into three parts. The initial liquid phase is only separated into two parts and one part is not removed from the process. The first part of the liquid phase (1/3 of the liquid phase) is reintroduced to the reactor and reacted with sulphur and carbon dioxide. The second part of the liquid phase (the remaining 2/3) is combined with the liquid phase ( $F_R$ ) which was obtained from washing and filtering the crystallized 2-MBT a second time. Applicants have not claimed their invention that is disclosed in the original specification. Therefore, the specification lacks adequate support for Claims 1-9.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Step (e) of claim 1 states the limitation of the "final

Art Unit: 1626

purification of the crystallized 2-MBT from step a) in the aniline liquid phase and separation of the pure product 2MBR from the liquid phase ( $F_r$ ) purification". It is unclear what is meant by this step. Is the crystallized 2-MBT being dissolved in the second part of the liquid phase or is it being dissolved in fresh aniline. What liquid phase is the crystallized 2-BT present in?

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. According to claim 1, there are different batches of the 2-mercaptobenzothiazole raw product that are being crystallized and it is unclear which batch Applicants are referring to.

### III. ***Objections***

#### *Claim Objections*

Claim 7 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 6. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

### IV. ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shawquia Young whose telephone number is 571-272-9043. The examiner can normally be reached on 6:30 AM-3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph McKane can be reached on 571-272-0699. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Shawquia Young/

Examiner, Art Unit 1626

/Rebecca L Anderson/

Primary Examiner, Art Unit 1626